Artificial Intelligence: Knowledge Representation: Summary

CPSC 433: Artificial Intelligence
Fall 2022
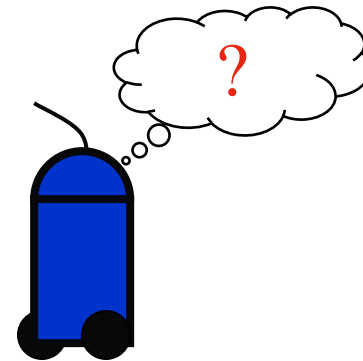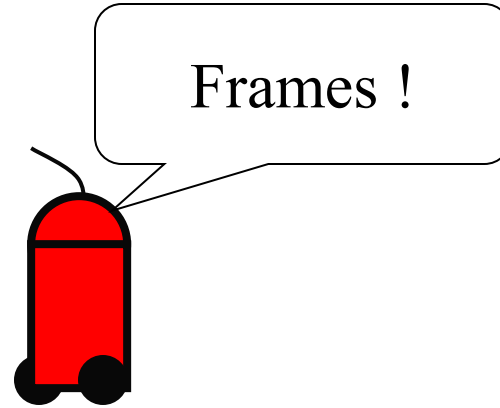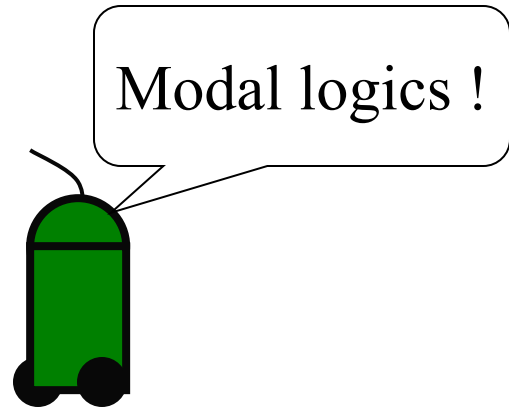
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What to use?

Modal logics !

Frames !

?

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Rules of thumb

- Theoretical investigations: what is possible?
  - ☞ Logics

- Knowledge already in very similar format
  - ☞ take format

- Hierarchical structures / inheritance
  - ☞ semantic nets, frames

- Represent certain input-output behavior
  - ☞ neural nets

- Laws, rules
  - ☞ rule sets

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Where to go from here?

We will talk about bias

Several different subareas of AI requiring whole course (or more) on their own.

- CPSC 544: Machine Learning (usual follow-up course)

- CPSC 567: Foundations of Multi-Agent Systems

- CPSC 568: Agent Communications

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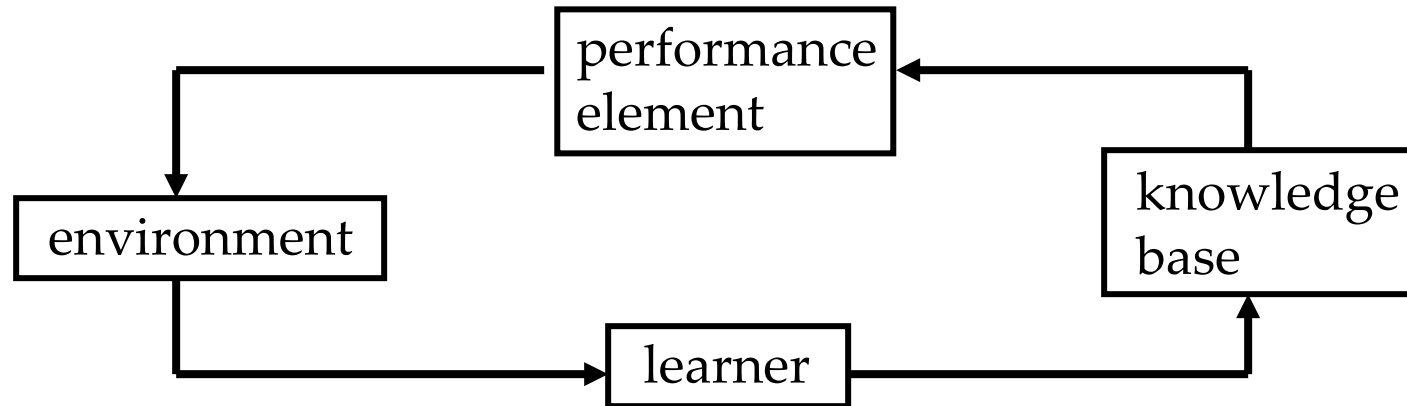CALGARY

Machine Learning

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Learning

In general:

Structuring (or restructuring) of knowledge (due to experiences)

In AI systems:

Restructuring in order to improve behavior of system

General Questions/Problems

Learning Phase:

■ How to represent and store the learned knowledge?

■ What or whom to learn from?

■ What learning method to use?

Application Phase

■ How to detect applicable knowledge?

■ How to apply knowledge?

■ How to detect and deal with misleading knowledge?

General questions

■ How to generalize, resp. detect and define similarities

■ How to combine knowledge from different sources?

What or whom to learn from

- Unsupervised learning
  ☞ learn from own experiences

- Supervised learning
  - ❑ Teacher(s) provide knowledge
  - ❑ Teacher provides evaluation of own experiences
  - ❑ Teacher can be observed

But what is a teacher? Only a human, another computer program, nature, etc.?

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What learning method to use

- Learning by heart
  (of prototypical cases)

- Decision-tree based learning (ID3, C4.5)

- Reinforcement learning

- Evolutionary methods, like
  - Classifier systems

- Neural Networks

- ...

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Onward to ...
CPSC 544?

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